

Operator Training

Sacrificial Anode Cathodic Protection

D H E C



PROMOTE



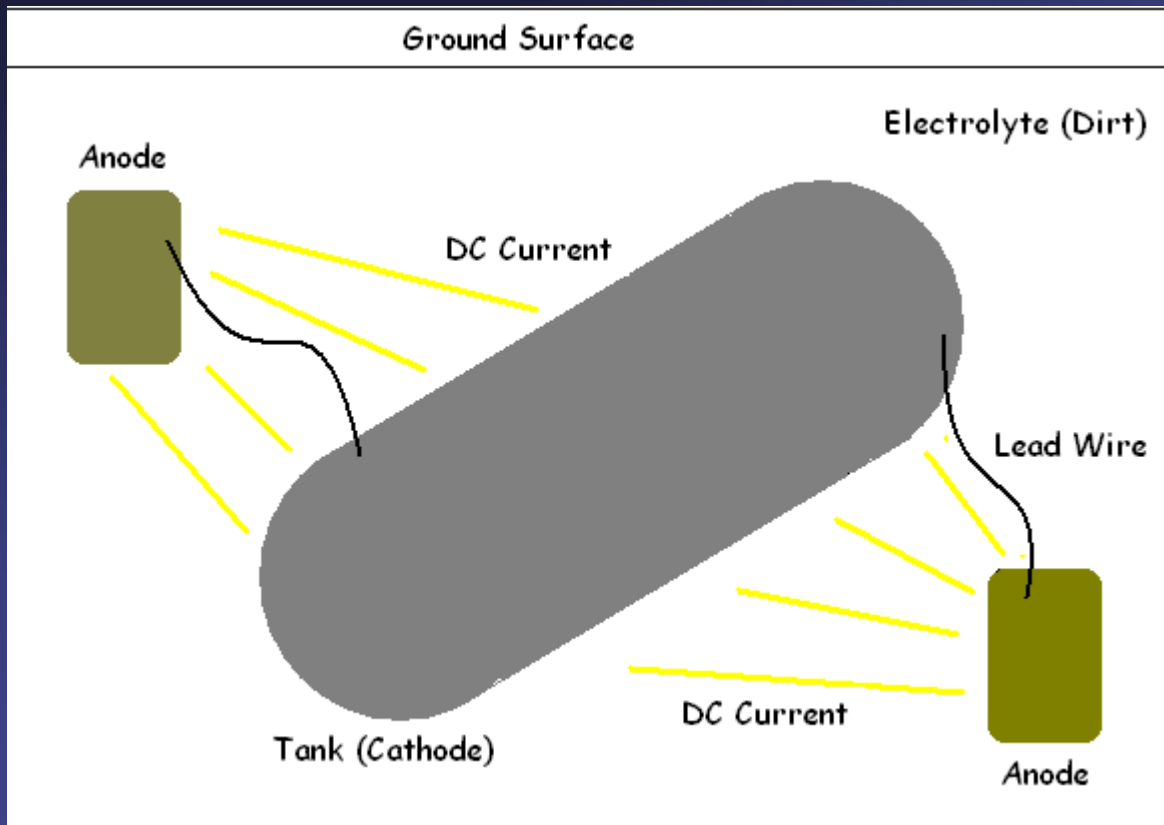
PROTECT



PROSPER

South Carolina Department of Health
and Environmental Control

Cathodic Protection



Components:

- Structure being protected (cathode)
- The anode(s) protecting the structure
- Environment
- Electric connection

Sacrificial Anode Cathodic Protection

Typically sacrificial anode systems are used on well-coated structures. The more exposed metal the anodes have to protect, the quicker they will be consumed.

Coated structures only need protection in areas where the coating is too thin or where there is a small pin-hole in the coating. This makes protection by sacrificial anodes ideal.

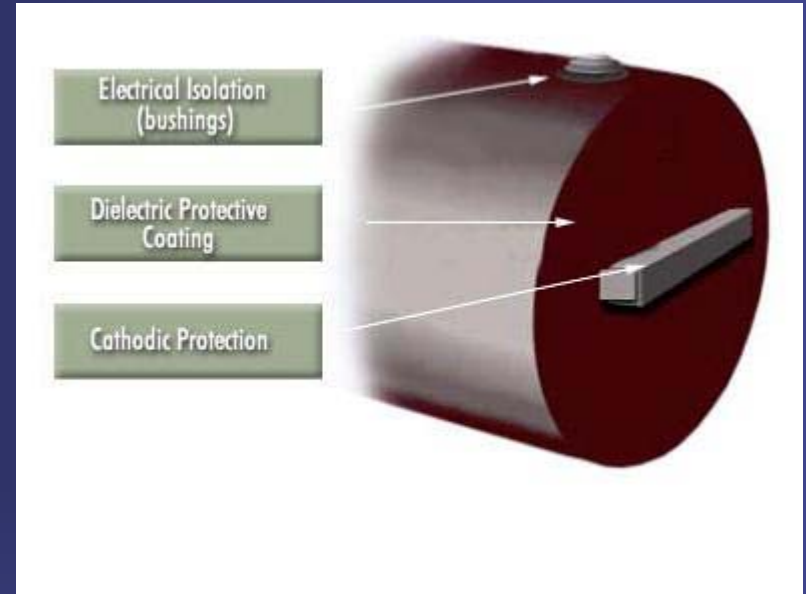


Sacrificial Anode Cathodic Protection

Sacrificial Anode cathodic protection uses anodes that are directly connected to the structure they are protecting by a bonding wire. Anodes are bars of metal usually made of zinc or magnesium.



Anode



Sacrificial Anode Cathodic Protection



Because zinc and magnesium anodes are more reactive than the tank or piping, they breakdown instead of the tank or piping. As they breakdown, they pass energy to the structure they are attached to, giving it protection from corrosion. We call the anodes “sacrificial anodes” because they are eventually consumed by the process. Anodes will have to be replaced over time in order to maintain sufficient protection.

Sacrificial Anode Cathodic Protection

The cathodic protection system must be tested at least once every three years by a qualified cathodic protection tester.



Sacrificial Anode Cathodic Protection

D H E C STATE OF SOUTH CAROLINA **Print Form**
IMPRESSED CURRENT CATHODIC PROTECTION SYSTEM EVALUATION

This form must be utilized to evaluate underground storage tank (UST) cathodic protection systems in South Carolina.
Access to the soil directly over the cathodically protected structure that is being evaluated must be provided.
A site drawing depicting the UST cathodic protection system and all reference electrode placements must be completed.

I. UST OWNER
NAME: _____ ADDRESS: _____
CITY: _____ STATE: _____ COUNTY: _____

II. UST FACILITY
NAME: _____ ID #: _____
ADDRESS: _____
CITY: _____ STATE: _____ COUNTY: _____

III. CP TESTER
TESTER'S NAME: _____
COMPANY NAME: _____
ADDRESS: _____
CITY: _____ STATE: _____

IV. CP TESTER'S QUALIFICATIONS
NACE INTERNATIONAL CERTIFICATION NUMBER: _____
CERTIFICATION DATE: _____ TYPE OF CERTIFICATION: _____
SOURCE OF CERTIFICATION: _____
OTHER (EXPLAIN): _____

V. REASON SURVEY WAS CONDUCTED (mark only one)
☐ Routine - 3 year ☐ Routine - within 6 months of installation ☐ 60-day re-survey after test ☐ Re-survey after repair/modification
Date next cathodic protection survey must be conducted: _____ (required within 6 months of installation/repair & every 3 years thereafter)

VI. CATHODIC PROTECTION TESTER'S EVALUATION (mark only one)
☐ **PASS** All protected structures at this facility pass the cathodic protection survey and it is judged that adequate cathodic protection has been provided to the UST system (indicate all criteria applicable by completion of Section VIII).
☐ **FAIL** One or more protected structures at this facility fail the cathodic protection survey and it is judged that adequate cathodic protection has not been provided to the UST system (complete Section IX).
☐ **INCONCLUSIVE** The cathodic protection survey of an impressed current system must be evaluated by a corrosion expert because one or more of the conditions listed in Section 7.1.5 of the SCDHEC cathodic protection guidance document are applicable (complete Section VII).

TESTER'S SIGNATURE: _____ DATE CP SURVEY PERFORMED: _____

VII. CORROSION EXPERT'S EVALUATION (mark only one)
The survey must be conducted and/or evaluated by a corrosion expert when: a) supplemental anodes or other changes in the construction of the impressed current system are made; b) stray current may be affecting buried metallic structures; or c) an inconclusive result was indicated in Section VI.
☐ **PASS** All protected structures at this facility pass the cathodic protection survey and it is judged that adequate cathodic protection has been provided to the UST system (indicate all criteria applicable by completion of Section VIII).
☐ **FAIL** One or more protected structures at this facility fail the cathodic protection survey and it is judged that adequate cathodic protection has not been provided to the UST system (indicate what action is necessary by completion of Section IX).

CORROSION EXPERT'S NAME: _____ COMPANY NAME: _____
NACE INTERNATIONAL CERTIFICATION: _____ NACE INTERNATIONAL CERTIFICATION NUMBER: _____
CORROSION EXPERT'S SIGNATURE: _____ DATE: _____

VIII. CRITERIA APPLICABLE TO EVALUATION (mark all that apply)
☐ **850 OFF** Structure-to-soil potential more negative than -850 mV with respect to a Cu/CuSO₄ reference electrode with protective current temporarily interrupted (instant-off).
☐ **100 mV POLARIZATION** Structure(s) exhibit at least 100 mV of cathodic polarization.

IX. ACTION REQUIRED AS A RESULT OF THIS EVALUATION (mark only one)
☐ **NONE** Cathodic protection is adequate. No further action is necessary at this time. Test again by no later than (see Section V).
☐ **RETEST** Cathodic protection may not be adequate. Retest during the next 60 days to determine if passing results can be achieved.
☐ **REPAIR & RETEST** Cathodic protection is not adequate. Repair/modification is necessary as soon as practical but within the next 60 days.

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DHEC 2561 (07/2002) SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL

- Test results must be on SC form (shown here)
- Keep two most recent tests on file at all times
- If test or part of the test fails, notify the Division immediately

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- If the test or part of the test fails, the system must be repaired within 30 days
- After the system is repaired, it must be retested within 6 months